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Attorney Docket No.	37261.p058	Total Pages (all documents)
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## A WINDOW OPERATOR

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(Only for new nonprovisional applications under 37 CFR 1.53(b))

See MPEP chapter 600 concerning utility patent application contents.

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## ACCOMPANYING APPLICATION PARTS

7. ☒ Assignment Papers (cover sheet & document(s))
8. ☐ 37 CFR3.73(b) Statement ☐ Power of Attorney  
(when there is an assignee)
9. ☐ English Translation Document (if applicable)
10. ☐ Information Disclosure ☐ Copies of IDS  
Statement (IDS)/PTO-1449 Citations
11. ☐ Preliminary Amendment
12. ☒ Return Receipt Postcard (MPEP 503)
13. ☒ \*Small Entity ☐ Statement filed in prior app  
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Attorney's Docket No: 37261. P658

Applicant or Patentee: ROY MALCOLM MOODY et al

Serial or Patent No:

Filed or Issued:

For: A WINDOW OPERATOR

**VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS  
(37 CFR 1.9(f) and 1.27(c) - SMALL BUSINESS CONCERN)**

I hereby declare that I am:

☐ the owner of the small business concern identified below:☒ an official of the small business concern empowered to act on behalf of the concern identified below:

NAME OF CONCERN: INTERLOCK GROUP LIMITED

ADDRESS OF CONCERN: Portsmouth Road, Miramar, Wellington, New Zealand

I hereby declare that the above identified small business concern qualifies as a small business concern as defined in 13 CFR 121.3-18, and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees under section 41(a) and (b) of Title 35, United States Code, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention, entitled:

A WINDOW OPERATOR

by inventor(s) ROY MALCOLM MOODY and ROBERT EFSTRATIOU and MALCOLM DAVID BOOSEY  
described in

☒ the specification filed herewith.☐ application serial no , filed☐ patent no , issued

If the rights held by the above identified small business concern are not exclusive, each individual, concern or organisation having rights to the invention is listed below \* and no rights to the invention are held by any person, other than the inventor, who could not qualify as a small business concern under 37 CFR 1.9(d) or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organisation under 37 CFR 1.9(e).

\* NOTE: Separate verified statements are required from each named person, concern or organisation having rights to the invention averring to their status as small entities (37 CFR 1.27)

NAME:

ADDRESS:

☐ INDIVIDUAL ☐ SMALL BUSINESS CONCERN ☐ NONPROFIT ORGANISATION

NAME:

ADDRESS:

☐ INDIVIDUAL ☐ SMALL BUSINESS CONCERN ☐ NONPROFIT ORGANISATION

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that wilful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such wilful false statements may jeopardise the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

NAME OF PERSON SIGNING:

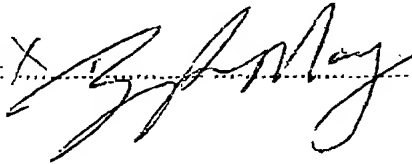
BRETT RAYMOND MAY

TITLE OF PERSON OTHER THAN OWNER:

Director

ADDRESS OF PERSON SIGNING:

90 Nigel Road, Browns Bay, Auckland,  
New Zealand

SIGNATURE: 

DATE: 

June 2000

09610229-070500

Applicant or Patentee: ROY MALCOLM MOODY et al

Serial or Patent No:

Filed or Issued:

For: A WINDOW OPERATOR

**VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS  
(37 CFR 1.9(f) and 1.27(b) - INDEPENDENT INVENTOR)**

As a below named inventor, I hereby declare that I qualify as an independent inventor as defined in 37 CFR 1.9(c) for purposes of paying reduced fees under section 41(a) and (b) of Title 35, United States Code, to the Patent and Trademark Office with regard to the invention entitled

A WINDOW OPERATOR

described in

- ☒ [ X ] the specification filed herewith.  
☐ [ ] application serial no filed  
☐ [ ] patent no , issued

I have not assigned, granted, conveyed or licensed and am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who could not be classified as an independent inventor under 37 CFR 1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organisation under 37 CFR 1.9(e).

Each person, concern or organisation to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey or license any rights in the invention is listed below:

- ☐ [ ] no such person, concern, or organisation.  
☒ [ X ] persons, concerns or organisations listed below.\*

\* NOTE: Separate verified statements are required from each named person, concern or organisation having rights to the invention averring to their status as small entities. (37 CFR 1.27)

FULL NAME: INTERLOCK GROUP LIMITED

ADDRESS: Portsmouth Road, Miramar, Wellington, New Zealand

☐ [ ] INDIVIDUAL ☒ [ X ] SMALL BUSINESS CONCERN ☐ [ ] NONPROFIT ORGANISATION

FULL NAME:

ADDRESS:

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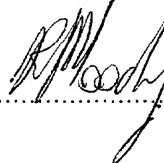
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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that wilful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such wilful false statements may jeopardise the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

NAME OF INVENTOR  
Roy Malcolm Moody

X 

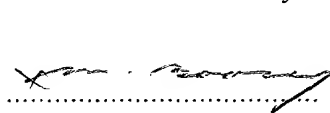
Date 27 June 2000

NAME OF INVENTOR  
Robert Efstratiou

X 

Date 27 June 2000

NAME OF INVENTOR  
Malcolm David Boosey

X 

Date 27 June 2000

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Our Ref. No.: 37261.P058  
Express Mail No. EM560648065US

UTILITY APPLICATION FOR UNITED STATES PATENT  
FOR  
**A WINDOW OPERATOR**

Inventor(s): ROY MALCOLM MOODY  
ROBERT EFSTRATIOU  
MALCOLM DAVID BOOSEY

005020"6230T860

## A WINDOW OPERATOR

### BACKGROUND TO THE INVENTION

5 This invention relates to a window operator.

It is well known to provide a window operator for controlling movement of a window sash relative to a window frame with which the sash is mounted by hinges.

10 The operator enables the sash to be moved between open and closed positions. Typically the window operator is surface mounted to the window frame and a drive arm couples the operator to the window sash. The housing incorporates a winding handle which drives via gears, the  
15 drive arm. By being surface mounted to the frame the window operator housing is readily apparent and can spoil the aesthetic appeal of the window frame/surround.

Typically a window sash is mounted within the window  
20 frame or surround by a pair of hinges which are commonly referred to as window stays. Therefore when mounting the sash within the frame the fabricator not only needs to install a pair of window stays but also needs to mount the window operator to the frame/surround and then  
25 mechanically connect the drive arm of the operator to the

sash. Therefore mounting of the sash within the frame/surround could be simplified and costs minimised if the window operator could be arranged to play some part in the mounting of the sash with the window frame.

5

For security reasons it is known to provide a window sash with a multi-point locking arrangement. The multi-point lock is controlled by a handle which is mounted externally on the frame/surround so as to enable the multi-point to be locked and unlocked. Yet again this can have an undesirable impact on the aesthetic appeal of the window frame/surround especially when the window frame/surround also mounts a window operator housing.

10  
15

#### SUMMARY OF INVENTION

It is therefore an object of the present invention to provide a window operator whereby the mechanical operating elements to apply a driving force to the sash can be concealed within the window frame/surround.

It is a further object of the present invention to provide a window operator which can achieve the



additional function of in part mounting a sash within the window frame/surround.

It is therefore yet a further object of the present invention to provide a window operator and multi-point lock combination whereby operation of the multi-point can be achieved via the window operator.

Broadly in one aspect of the invention there is provided a window operator including a mounting means, an elongate threaded member mounted with the mounting means, drive means to apply a rotational movement to the elongate threaded member, a threaded element located on the elongate threaded member, a hinge means with which a window sash can be mounted and coupling means moveable in response to movement of the threaded element on the elongate threaded member the hinge means being associated with the coupling means such that movement of the coupling means results in movement of the hinge means.

20

According to another broad aspect of the invention there is provided a window operator including a mounting means and drive transfer means mountable in a cavity formed between a window sash and window frame when the sash is

in the closed position such that the mounting means and drive transfer means are not visible, an operator handle and handle mounting means mountable to a surface of the window frame, the operator handle being coupled to the drive transfer means and the drive transfer means being drivingly coupled to an elongate threaded member mounted with the mounting means, a threaded element located on the elongate threaded member being connected to link means engageable with the window sash.

10

In a third broad aspect of the invention there is provided a window operator according to the first broad aspect further including lost motion means between the threaded element and the coupling means, and engagement means for engaging with a locking means mountable with the window sash, the engagement means being movable by said lost motion means to operate the locking means.

15

#### BRIEF DESCRIPTION OF THE DRAWINGS

20

Figure 1 is a perspective view of a window frame and sash incorporating a window operator of the present invention the sash being in an open position,

Figure 2 is a view similar to Figure 1 but with the window sash removed,

Figure 3 is a plan view of the arrangement shown in Figure 1,

Figure 4 is a perspective view of the window operator and an associated multi-point lock,

Figure 5 is an elevation view of the window surround and operator with the multi-point lock,

Figure 6 is a detail view taken from Figure 5,

Figure 7 is a perspective view of the corner drive device,

Figure 8 is a perspective view of one of the two identical housing components of the corner drive device,

Figure 9 is a perspective view similar to Figure 7 but with one of the housing components removed,

Figure 10 is a view similar to Figure 4 but of an alternative form of the invention,

Figure 11 is a plan part view of the alternative arrangement shown in Figure 10, and

Figure 12 is yet a further view similar to Figure 4 but showing a further alternative arrangement.

# 10            DESCRIPTION OF THE PREFERRED EMBODIMENTS

As can be seen from the drawings, the majority of the window operator 10 is mounted to the window frame and located within a cavity which is formed between the window frame F and the window sash S when the sash is in the closed position. The window operator handle 11 is mounted with a mounting plate or housing 12 which surface mounts to the surface of the frame F.

20 A drive shaft (not shown) extends from the handle 11 through the frame F to engage with bevel gears (not shown) located within a housing 13. The housing 13 is mounted with or formed as part of a mounting plate 14. The mounting plate 14 is provided with suitable openings

15 for attachment by suitable mechanical fasteners to the  
frame F.

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The bevel gears within housing 13 are drivingly coupled  
5 to a lead screw 16 which is journalled in suitable  
bearings 17. The bearings 17 and lead screw 16 are in  
the preferred form located within an elongate housing 18  
which extends along one side of mounting plate 14. The  
housing 18 is provided with an elongate longitudinally  
10 extending gap 19 (See Figure 4) which is located adjacent  
to but slightly above the surface of mounting plate 14.

A nut 66 is threaded onto the lead screw 16. Nut 66 is  
coupled to a driver 67. Accordingly as handle 11 is  
15 rotated a drive via the drive shaft and bevel gears is  
imparted to the lead screw 16. Depending on the rotation  
of the handle 11, the nut 66 moves along the lead screw  
16 either toward the housing 13 (window opening) or  
toward the distal end of the lead screw 16 (window  
20 closing).

The driver 67 has a sleeve 20 which is journalled onto  
lead screw 16. The driver 67 is also coupled in a manner  
which will hereinafter be described to a follower 21.

The follower 21 has a sliding element 22 which slides within elongate housing 18. Furthermore the follower 21 has a mounting plate 23 to which arms 24 and 25 of a window stay 26 are mounted by pivot bearings 27.

5 The window stay 26 is of a largely conventional construction whereby arm 24 is pivotally coupled at one end to a sash mounting plate 68 while arm 25 is pivotally coupled in the length of a long arm 28. This long arm 28 is also pivotally coupled at one end to the sash plate  
10 68. The other end of the long arm 28 is pivotally mounted by bearing 29 to a mounting flange or base 30.

The elongate mounting plate 14 has, at the end opposite to housing 13, an end stop 31. End stop 31 includes a  
15 plug 32 for engagement with elongate housing 18. The end stop 31 also includes, in a conventional manner, a head lock 33 for engagement with the pivot coupled arm 24 and sash plate 27.

20 Thus according to the present invention the window stay 26 forms part of the window operator 10. The window stay 26 thus in part hingedly mounts the sash S within the window frame F. It also imparts opening and closing movement to the sash S as a consequence of movement of

follower 21 which is caused to move due to its coupling via driver 67 to nut 66. Thus as nut 18 moves along lead screw 16 in response to a winding action being applied to handle 11 the stay 26 moves the sash.

5

The operator mechanism is concealed within the frame F with the only externally visible elements (when the sash is in the closed position) being the handle 11 and the mounting plate or sub-housing 12.

10

In a preferred form of the invention a lost motion mechanism couples the driver 67 to the follower 21. This lost motion mechanism enables the operator 10 to also operate a multi-point lock mechanism 34.

15

The multi-point mechanism 34 includes in a conventional manner a first lock plate 35 which, in the casement installation of a sash S in a frame F as illustrated, locates with the bottom edge surface of the sash S. A second lock plate 36 engages with the vertical edge surface of the sash S which is opposite to the hinge side of the sash.

20

The lock plates 35 and 36 are coupled by a corner drive 37 which essentially consists of a housing 38 within which a connector means 39 is slidably engaged. One end of the connector means 39 is coupled to lock plate 35 5 while the other end is coupled to lock plate 36. The housing has openings 38a which enables the housing to be fastened by eg. screws to the corner of the sash.

In a conventional manner, a pair of elongate slots 40 are 10 formed in lock plate 35. Engaged through slots 40 are headed pins, spigots or the like 40' which engage or are fastened to the sash S. More or less slots 40 and spigots 40' may be employed as necessary. This is a known arrangement which enables the lock plate 35 to be 15 longitudinally slidable. In a like manner elongate slots 41 are provided in the second lock plate 36 so that it also is slidably mountable with the sash S.

A pair of keepers 42 are mountable with the frame F. The 20 keepers 42 each incorporate a flange 43. The lock plate 36 includes a pair of lock pins 44 which upon the lock plate 36 being moved to a locking position, when the window sash S is closed, engage behind the flanges 43.



Figure 5 shows only two keepers. More or less keepers 42 and lock pins 44 may be incorporated as necessary.

This movement of lock plate 36 is imparted by sliding  
5 movement of lock plate 35 which will now be described.

A land 45 (part of the follower 21) is connected with  
driver 67 via a pin 46. This pin is mounted so that it  
can move transverse to the direction in which the driver  
10 67 is able to move along the mounting plate 14. An end  
of the pin 46 locates in a shaped slot 47 in the mounting  
plate 14. A portion of the pin 46 which extends up from  
land 45 engages in an L-shaped slot 48 in the driver 67.

15 Pin 46 will normally sit within a short portion 49 of the  
L-shaped slot 48. Consequently as the nut 66 moves along  
the lead screw 16 the movement of the driver 67 (which is  
coupled to the nut 66) is imparted to the follower 21 by  
the pin 46. During this movement the slot 47 extends  
20 substantially longitudinally along the mounting plate 14,  
thereby ensuring that the pin 46 remains within portion  
49 of the L-shaped slot 48.

However, as the sash approaches its closed position, the slot 47 inclines toward the edge of the mounting plate 14 opposite that at which the housing 18 is located. This causes pin 46 to progressively slide transversely so that it ultimately takes up a position whereby it is aligned with the long portion of L-shaped slot 48. Consequently as the nut 66 continues to move along the lead screw 16, the coupling between the driver 67 and the follower 21 ceases. As a result the driver 67 moves independent of the follower 21. This corresponds with relative movement between the driver 67 and pin 46 so that ultimately pin 46 locates at the end of the long portion of L-shaped slot 48.

As the sash S approaches its fully closed position, a tab 50 fixed with driver 67 engages in a cut-out 51 in the downwardly projecting coupler 52 which is mounted by rivets 53 or the like to the underside of lock plate 35. Consequently continued movement of driver 67 applies via the inter-engagement of tab 51 in coupler 52 a longitudinal sliding movement to plate 35. This movement is transferred via corner drive 37 to lock plate 36 so that the pins 44 locate behind flanges 43 of keepers 42 as hereinbefore described. Locking of the non hinge-side

of the sash in the frame in a multi-point locking arrangement is thereby achieved.

Pivot 54 which joins arm 25 to the long arm 28 has a  
5 downwardly projecting portion 57 (see Figure 6) which  
engages in a shaped slot 55 in the driver 67. As the  
sash S approaches a closed position the projecting  
portion 57 enters the forward facing open end of the  
angled portion of slot 55. The projecting portion 57  
10 thus ultimately becomes located behind upstand 56 which  
forms part of the slot 55. Therefore the window stay 26  
is locked in the closed position by the engagement of the  
projecting portion 57 behind the upstand 56.

15 As a consequence of the above described arrangement, the  
handle 11 can be rotated beyond the point where the  
operator 10 has via stay 26 moved the sash S to a fully  
closed position within frame F. This rotation results in  
multi-point locking of the sash to automatically occur  
20 due to the engagement of pins 44 with keepers 42 and the  
projecting portion 57 behind upstand 56. The hinge side  
of the sash S is further locked in position by the  
headlock 33 cooperating with the stay 26 in a  
conventional manner.

Upon the handle 11 being wound to open the window sash S, the first action which takes place is movement of the driver 67 relative to the follower 21 which in the reverse of the previously mentioned operation aligns the  
5 tab 50 with opening 51 in coupler 52 and positions the projecting portion 57 of pivot bearing 54 in slot 55 so that it is clear of upstand 56. Therefore the first action upon operation of the operator 10 is an unlocking action.

10

Continued movement of the driver 19 results in pin 46 engaging with the end wall of the long portion of L-shaped slot 48 thereby effecting a driving coupling with the follower 21 so that the follower 21 commences  
15 movement and operates the window stay 26 in a normal manner so as to cause the sash S to open.

Corner drive devices to achieve the function of the corner drive 37 are known. Such devices are used for  
20 transmitting motion around a corner (from horizontal to vertical plane, or vice versa) of a window frame or sash to move, for example, lock bars. Movement of one of the connectors to which a lock bar is connected is transmitted by a captivated strap which extends to

another connector which in turn is connected to a lock or drive bar.

Most of these corner drive devices use a single piece housing (usually zinc) which necessitates fixing the strap to one or both connectors once the connectors and strap have been assembled into the housing. A different approach, however, is taken in the corner drive device which is preferably used in the present invention.

10

Figure 7 of the drawings shows the corner drive 37 and strap 39. Each end of the strap 39 is riveted (or fixed by other means) to a connector 58.

15 The housing 38 is comprised of two identical parts 59. These are constructed and arranged so that they can be snapped together by clips. The strap 39 is placed in one of the housing parts 59 and the second housing part 59 is then snapped onto the first part to complete the unit.

20

Figure 8 provides a perspective illustration of one of the housing components 59. This illustrates that adjacent each housing opening 38a are a pair of legs 60 each having oppositely and outwardly disposed ramp

portions 61. To the other side of each opening 38a is a slot 62. Accordingly, when two of the housing components 59 are brought together the respective legs 60 engage into the opposing slot 62 in a snap-lock arrangement to  
5 thereby couple the housing components together.

During installation of the corner drive 39, the housing components 59 are additionally secured together by the fixing screws which extend through openings 38a to mount  
10 the corner drive device to the window sash or frame. The fixing screws pass through the front screw boss 63, one of the housing components 59 and the back screw boss 64 of the other component, these two bosses combining to define the aforementioned opening 38a.

15 As shown in Figure 9, a screw slot 65 is formed in the connector 58 to allow the fixing screws to pass through the connector without inhibiting the connector from its sliding movement.

20 Essentially, therefore, the drive unit comprises two identical snap-together housing components which enable the connectors 58 and strap 39 to be assembled together prior to fitting to the housing.

Referring to Figures 10 and 11, there is shown an alternative arrangement whereby the "lost motion" coupling between the driver 67 and the follower 21. This mechanism is effectively formed by a toggle device comprising a first toggle arm 70 pivotally coupled at one end to the follower 21. The other toggle arm 71 is pivotally coupled to the driver 67. The free end of the toggle arm 71 has an upstand 72. In the vicinity of the pivot coupling of the first toggle arm 70 to the follower 21 there is a shoulder 73.

Usually, as shown in Figure 10, the toggle arms 70 and 71 are aligned or straight. The arms 70 and 71 are prevented from toggling one way by the shoulder 73 on the follower 21 and the other way by the upstand 72 on the toggle arm 71 resting on the elongate housing 18.

When the window sash is almost closed the control arm 25 of the stay hits the upstand 72 and induces toggling to occur. This occurs when the upstand 72 is opposite a notch 74 in the housing 18. The free ends of the toggle arms 70 and 71 are thus able to pivot into the cavity of the housing 18 with the result that the driver 67 can

move independently of the follower 21 and thereby carry out the locking action as described previously.

Upon opening of the window sash the toggle arms 70 and 71  
5 are pulled straight by the driver 67 moving during the  
unlocking operation. Upon the arms moving into the  
aligned or straight position the coupling effect between  
the driver 67 and follower 21 is complete with the result  
that the follower 21 moves in response to movement of the  
10 driver 67.

When the toggling of the toggle arms 70 and 71 occurs at  
the sash moving to its closed position, the pin 54 is  
captured by the slot 55 as described previously.  
15 However, in an alternative arrangement as shown in Figure  
12, the slot 55 can be repositioned on the driver 67 and  
engageable therein is a pin (not shown) which is mounted  
with the control arm 25 rather than at the pivot join of  
the control arm and the long arm 28.

20

The present invention thus provides an operator which  
incorporates a window stay thereby obviating the need for  
one of the window stays for mounting of the sash and the  
frame. The operator can also include the means for



operating a multi-point. Also the operator is of a construction whereby it can be concealed within the frame F so that only the handle and the mounting part for the handle is readily visible when the window is closed.

5 This enhances the aesthetic appeal of the window.

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WHAT IS CLAIMED IS

- 5 1. A window operator including a mounting means, an  
elongate threaded member mounted with the mounting a  
drive mechanism to apply a rotational movement to the  
elongate threaded member, a threaded element located  
on the elongate threaded member, a hinge with which a  
10 window sash can be mounted and a coupling moveable in  
response to movement of the threaded element on the  
elongate threaded member the hinge being associated  
with the coupling such that movement of the coupling  
results in movement of the hinge.
- 15 2. A window operator including a mounting means and  
drive transfer mountable in a cavity formed between a  
window sash and window frame when the sash is in the  
closed position such that the mounting and drive  
20 transfer are not visible, an operator handle and  
handle mounting mountable to a surface of the window  
frame, the operator handle being coupled to the drive  
transfer and the drive transfer being drivingly  
coupled to an elongate threaded member mounted with  
25 the mounting, a threaded element located on the

elongate threaded member being connected to a hinge engageable with the window sash.

3. A window operator as claimed in claim 1, further  
5 including a lost motion mechanism between the threaded element and the coupling, and an engagement device for engaging with a locking arrangement mounted with the window sash, the engagement device being movable by said lost motion mechanism to apply  
10 a locking action to the locking arrangement.
4. A window operator as claimed in claim 1 wherein the coupling includes a driver element and a follower element, the follower element having a mounting with  
15 which at least one arm of the hinge is pivotally attached.
5. A window operator as claimed in claim 4 wherein the threaded member is housed within an elongate housing  
20 the driver element being located externally of the elongate housing and coupled to the threaded element within the elongate housing, the follower being coupled to a sliding element slidably engaged within the elongate housing.

6. A window operator as claimed in claim 5 further including an end stop with which the sliding element is engageable.

5 7. A window operator as claimed in claim 6 wherein the end stop includes a head lock with which a part of the hinge is engageable.

10 8. A window operator as claimed in claim 5 wherein the elongate housing is attached to the mounting.

15 9. A window operator as claimed in claim 3 in combination with the locking arrangement, said locking arrangement be a multi-point lock mechanism.

20 10. The combination of claim 9 wherein the multi-point lock mechanism includes a first lock element, the first lock element having an engagement member, the coupling having a driver which upon engagement with the engagement member imparts movement to the first lock element.

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11. The combination of claim 10 further including a second lock element coupled to the first lock element by a corner drive.

5 12. The combination of claim 11 further including at least one keeper mountable with a part of a window construction, the second lock element including a first projection which when the second lock element is moved to a locking position interengages with a  
10 second projection of the keeper.

13. The combination of claim 11 wherein the corner drive includes a housing formed from first and second housing sections and a flexible elongate element  
15 slidably captured between the first and second housing sections.

14. The combination of claim 13 wherein the first and second housing sections are snap-locked together by  
20 clip devices.

15. The combination of claim 14 wherein the first and second housing sections further include apertures which are aligned upon the first and second housing

sections being combined, the aligned openings being such as to receive a mechanical fastener to mount the corner and further fix the first and second housing sections together.

5

16. The combination of claim 15 wherein a connect is fixed to each end of the flexible elongate element, each connector including an elongate opening through which a said mechanical fastener can project.

10

17. The combination of claim 9 wherein the lost motion coupling is formed by a toggle mechanism and a trigger element mountable with a part of a window construction to induce toggling of the toggle mechanism.

15

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ABSTRACT OF DISCLOSURE

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A window operator for moving a window sash in a window frame (F) between open and closed positions. The window operator has a mounting plate (14), an elongate threaded member (16) mounted with the mounting plate (14). A drive handle (11) enables a rotational movement to be applied to the elongate threaded member (16). A threaded element (66) is located on the elongate threaded member (16). A hinge (26) with which a window sash can be mounted is attached to a coupling means (23) moveable in response to movement of the threaded element (66) on the elongate threaded member (16). The hinge (26) has one arm (28) pivotally coupled to the mounting plate (14). Because arms (24 and 25) of the hinge (26) is attached to the coupling (23) movement of the coupling (23) results in movement of the hinge (26).

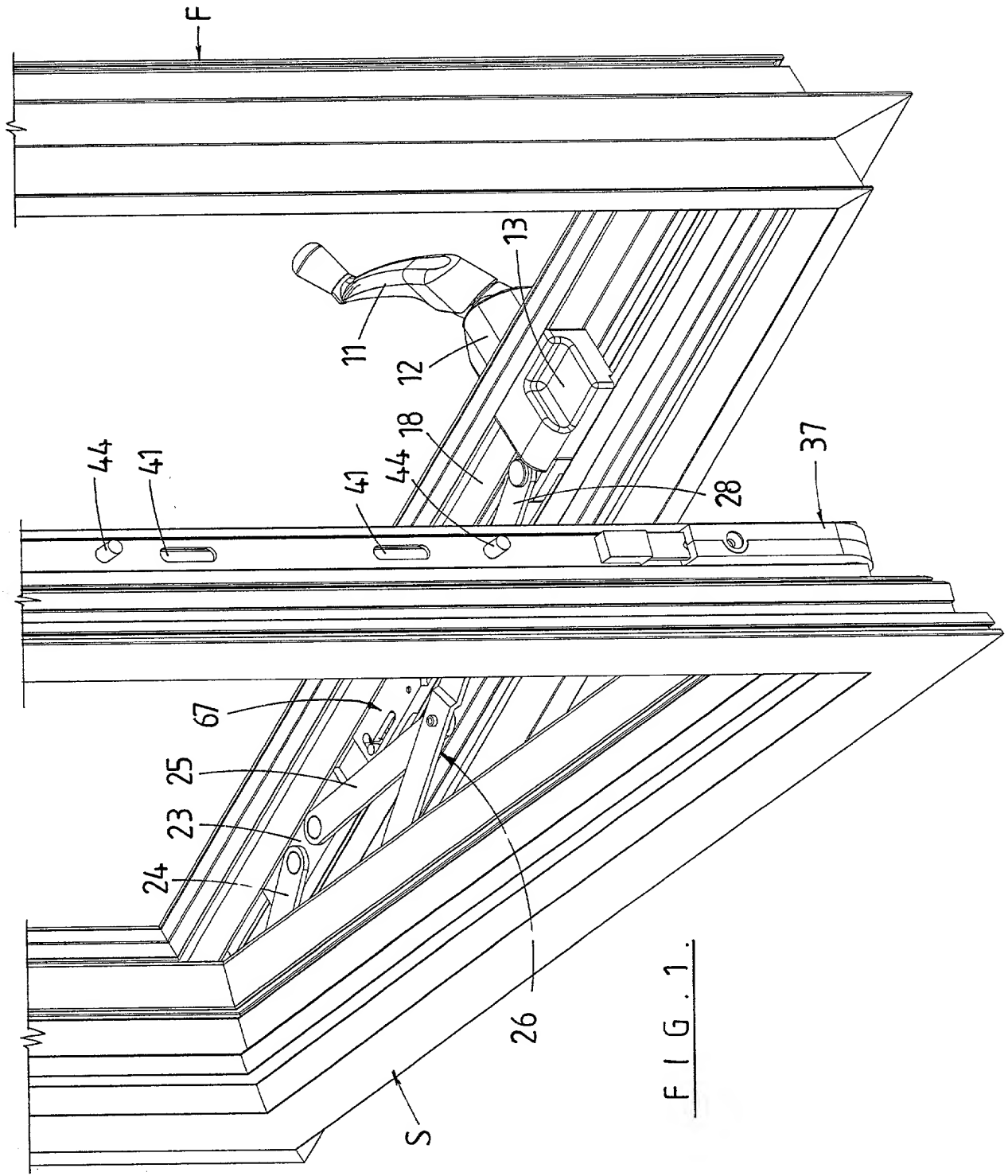


FIG. 1.



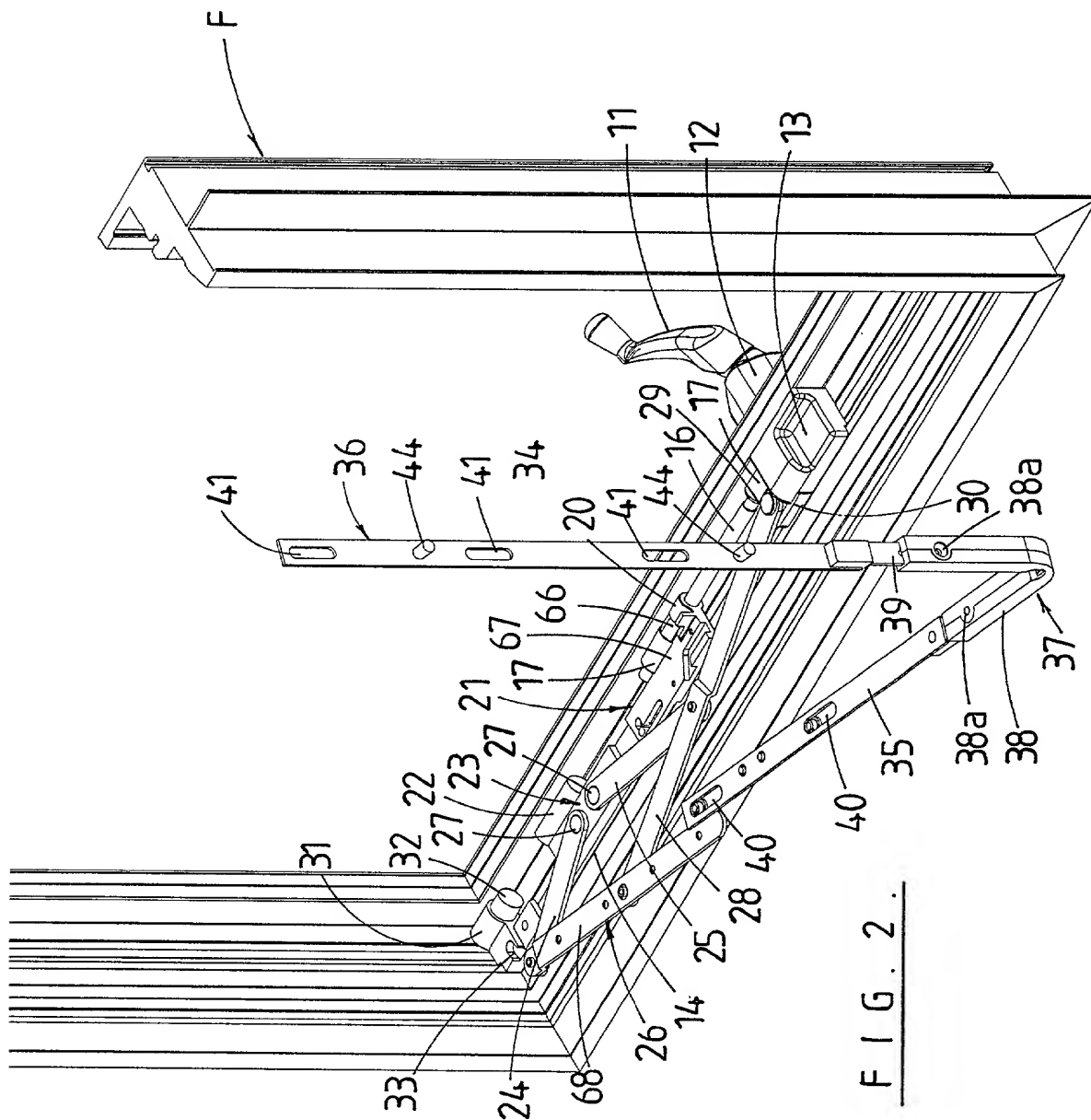


FIG. 2.

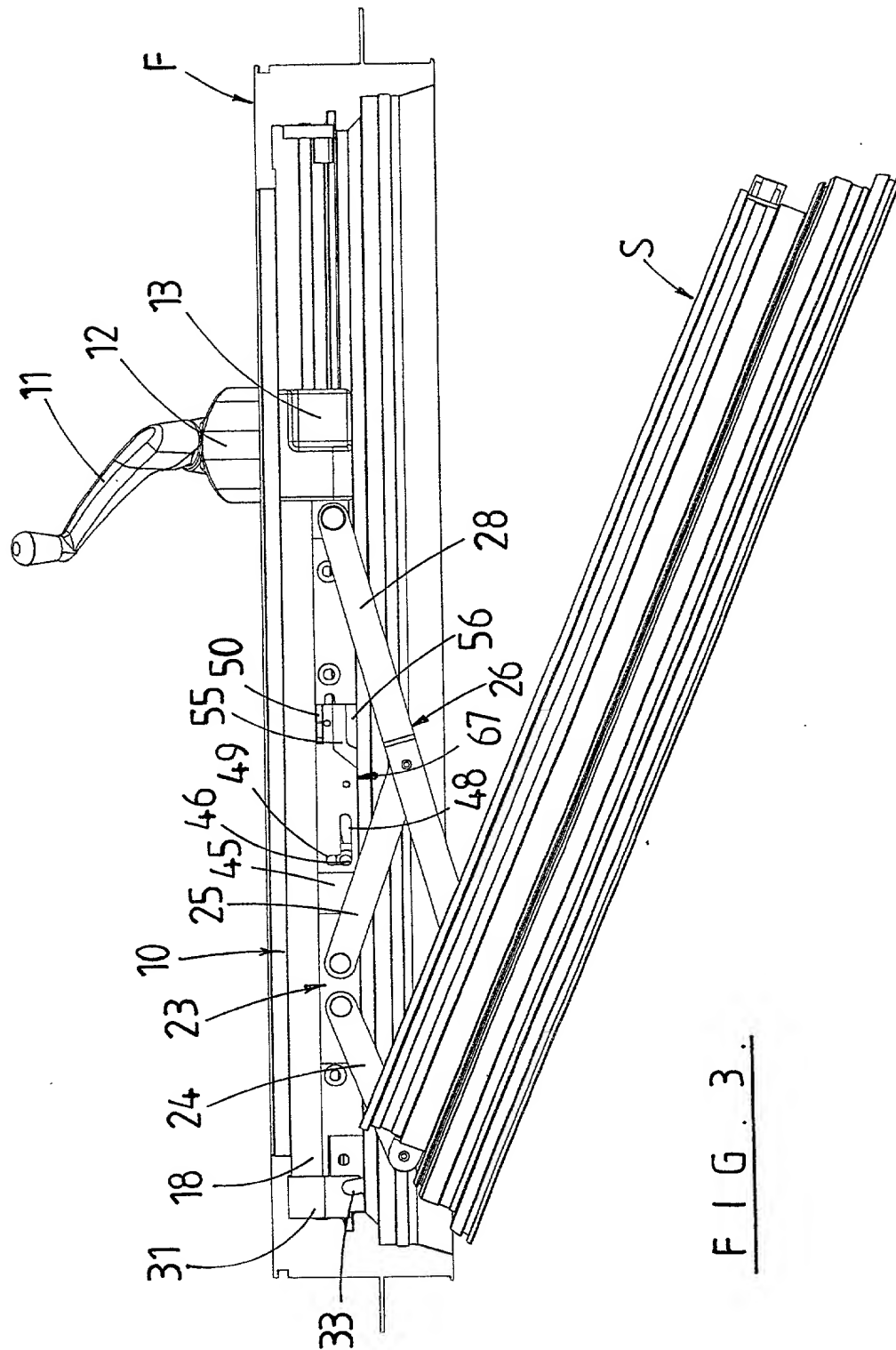


FIG. 3.



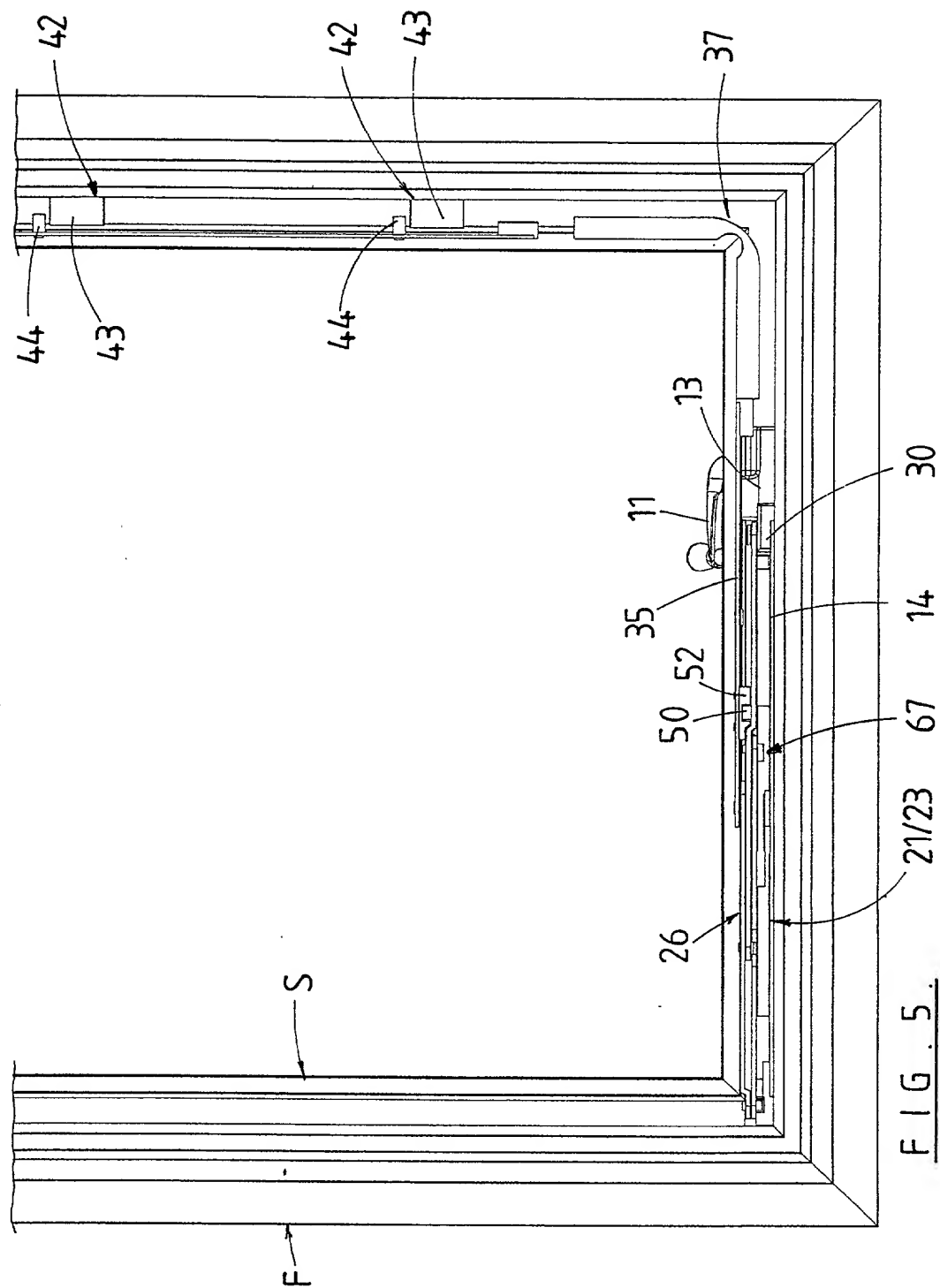
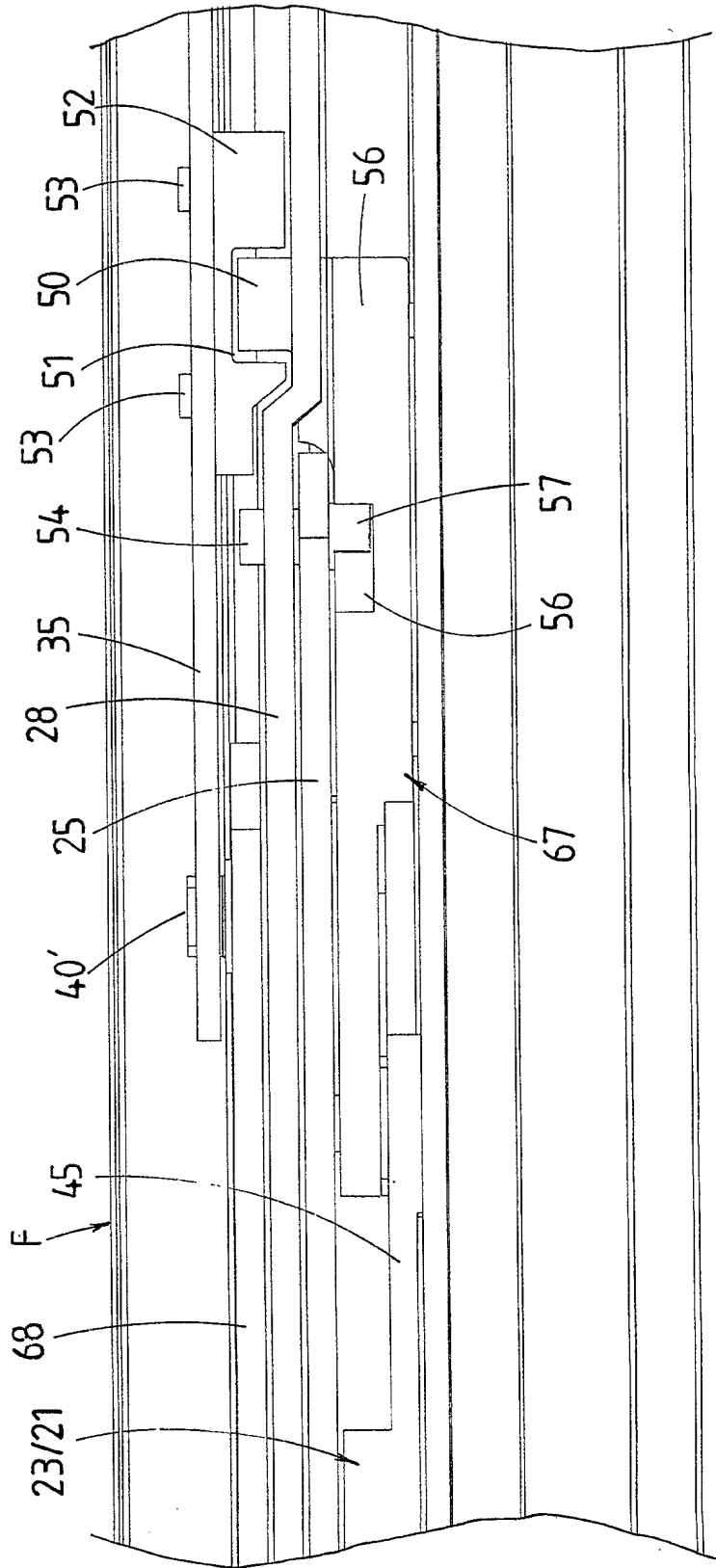
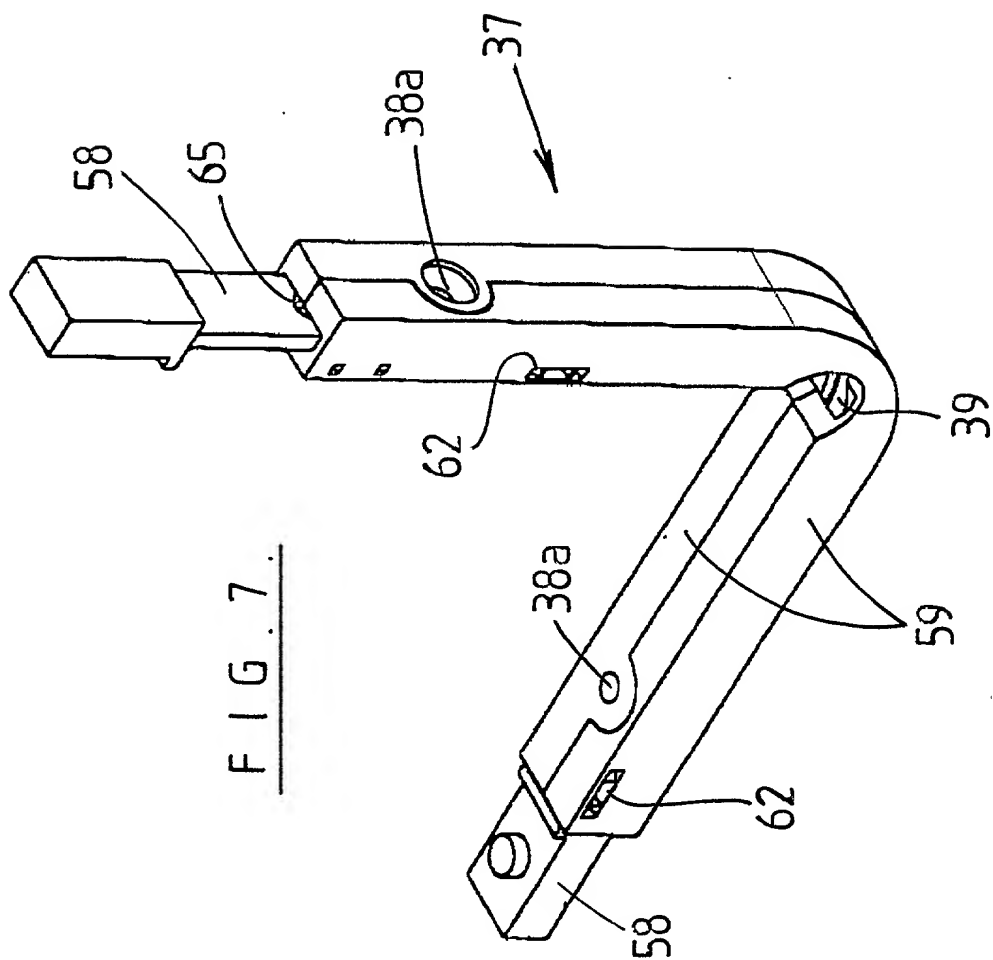
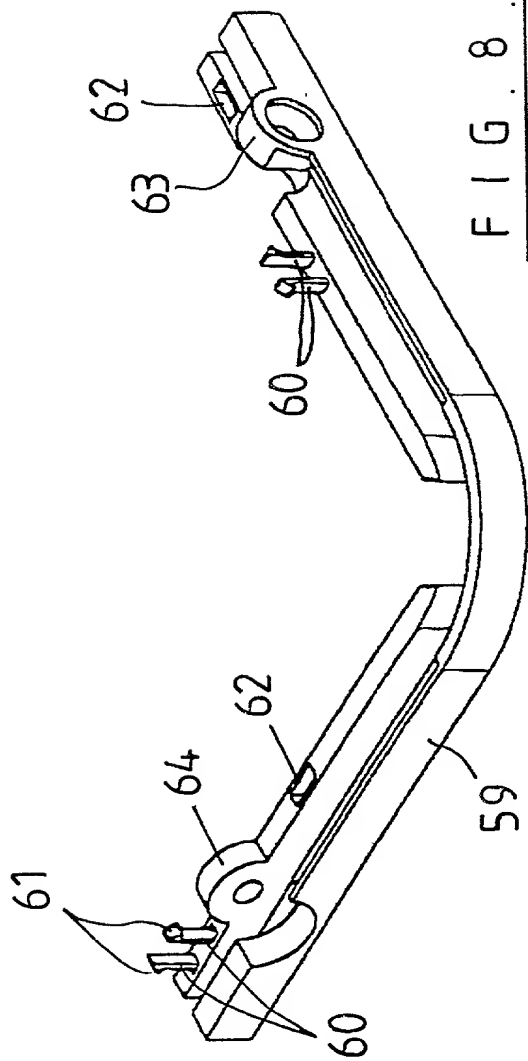


FIG. 6.







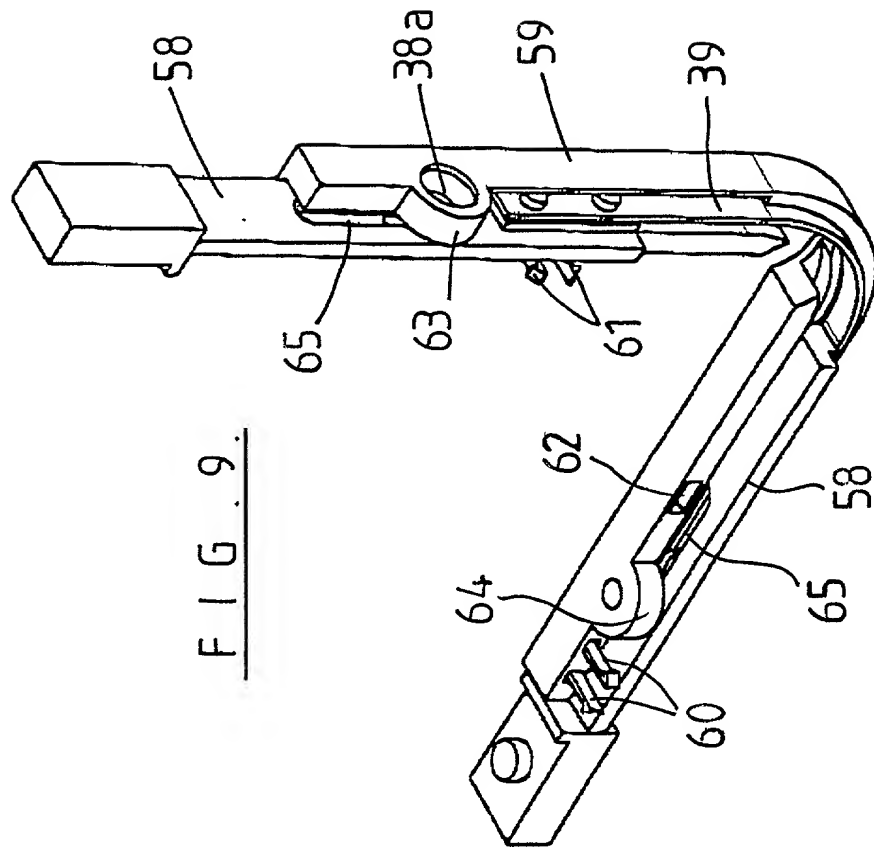


FIG. 9.



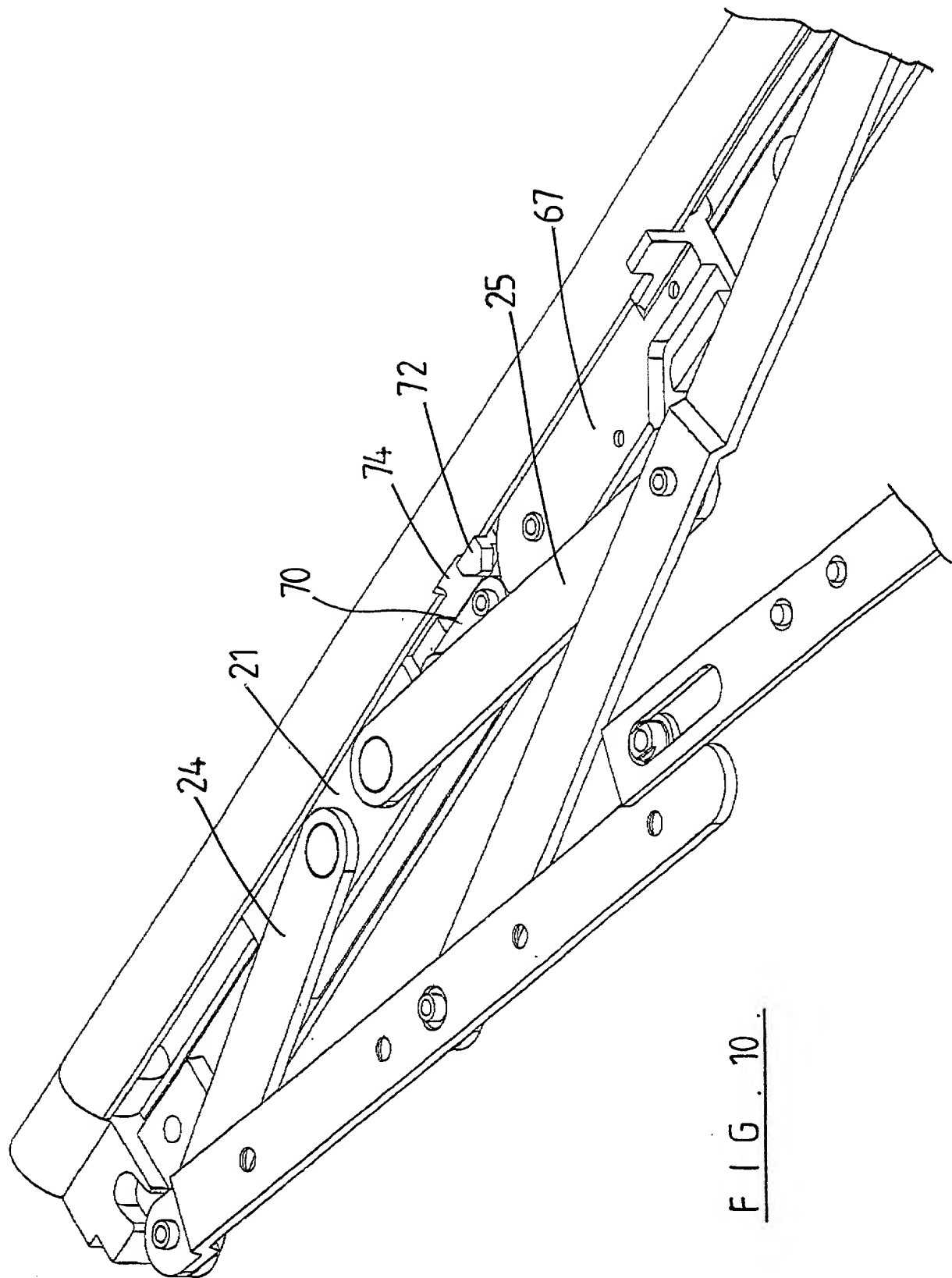


FIG. 10.



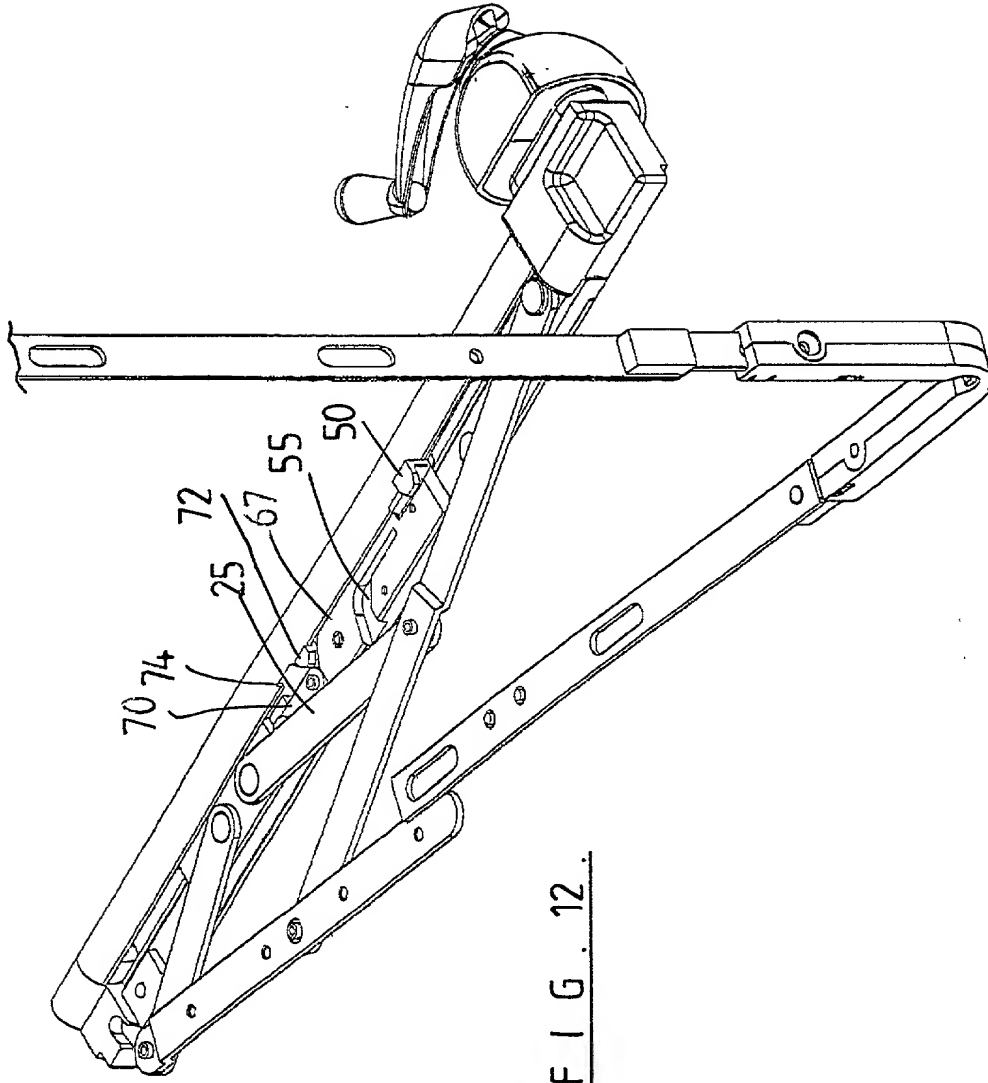


FIG. 12.

**COMBINED DECLARATION AND POWER OF ATTORNEY FOR UTILITY  
PATENT APPLICATION**

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first, and joint/sole inventor(s) of the subject matter which is claimed and for which a patent is sought on the invention entitled A Window Operator.

the specification of which (check only one item below):

- [ x ] is attached hereto.
- [   ] was filed as United States application Serial No. \_\_\_\_\_  
on \_\_\_\_\_ and was amended on \_\_\_\_\_  
(if applicable).
- [   ] was filed as PCT international application No. \_\_\_\_\_  
on \_\_\_\_\_ and was amended under PCT  
Article 19 on \_\_\_\_\_ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above. I do not know and do not believe that the same was ever known or used in the United States of America before my invention thereof, or patented or described in any printed publication in any country before my invention thereof or more than one year prior to this application, that the same was not in public use or on sale in the United States of America more than one year prior to this application, and that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to this application.

I acknowledge the duty to disclose information material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States code, §119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed

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below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

PRIOR FOREIGN /PCT APPLICATION(S) AND ANY PRIORITY CLAIMES UNDER 35 U.S.C. 119:

COUNTRY (if PCT indicate PCT)	APPLICATION NO.	DATE OF FILING	PRIORITY CLAIMED UNDER 35 U.S.C.119
New Zealand	336579	July 5, 1999	Yes

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112 I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR BENEFIT UNDER 35 U.S.C. 120:

Application Serial No.	Filing Date	Status (pending patented, abandoned)
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POWER OF ATTORNEY: As a named inventor, I hereby appoint:

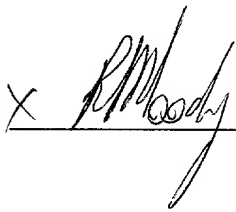
Bradley J Bereznak; Roger W Blakely, Jr; Lori N Boatright; David R Halvorson; George W Hoover; Eric S Hyman; Dennis G Martin; Ronald W Reagin; James H Salter; James C Scheller; Maria E Sobrina; Stanley W Sokoloff; Edwin H Taylor; Lester J Vincent; Ben J Yorks; and Norman Zafman of the City of Los Angeles, State of California, all Attorneys at Law admitted to practise in all the Courts of the State of California, Tracy L Hurt admitted to practise in all the Courts of the State of Georgia, and Christopher W Wells admitted to practise in all the Courts of the District of Columbia and the State of Virginia; my attorneys, with full powers of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith; and I hereby request that all correspondence regarding this application be sent to the firm of BLAKELY SOKOLOFF TAYLOR & ZAFMAN, whose Post Office address is 12400 Wilshire Boulevard, Seventh Floor, Los Angeles, California 90025-1026, UNITED STATES OF AMERICA (213) 207 3800.

I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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